Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of CIVIL ENGINEERING Department

To give the nation qualitative Civil Engineers, who can contribute for the construction of a better world with sophisticated infrastructural facilities, eco-friendly houses, modern transportation facilities with a pollution free environment and to protect the precious natural resources of this planet.

Mission of CIVIL ENGINEERING Department

1. To shape the students into good entrepreneurs and to promote self-confidence and all-round development of the student personality through special lectures, practical training programs, field visits and technical seminars.
2. To train the students to acquire generic knowledge in the areas of Civil Engineering
3. To continuously update the physical infrastructure through modernization, thrust area development, R & D and other schemes
4. To generate knowledge base through sustained research and developmental efforts.
5. To produce engineers with self-confidence and overall personality who can be self-employed and generate employment opportunities to fellow engineers and take active part in nation building,
6. Keeping in view the challenges of the future.

Program Educational Objectives (PEOs)

PEO:1

The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the civil structures, and make them to understand the impact of civil engineering projects how they effects the society and environment in case of failures.

PEO:2

To develop their communication skills(Oral, Written, Visual, Graphic modes) which makes them to participate actively in their communities and profession when working as team leaders or members.

PEO:3

An intensive training is provided to identify, formulate and solving engineering problems in technical areas appropriate CIVIL ENGINEERING.

PEO:4

To make them competent and engaged engineering professionals applying their technical and managerial skills in planning, designing and construction.

Program Outcomes (POs) of CIVIL ENGINEERING Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of CIVIL ENGINEERING Department

PSO 1:

An ability to learn constructional concepts and to implement them in the field work and to make the structural planning in a smarter way.

PSO 2:

To encourage young energetic engineers in technical and software skills in the field of Civil Engineering with innovative thoughts along with existing and future trends in constructional field.

PSO 3 :

The capability to integrate knowledge in constructional field work and to improve skills to become an entrepreneur.

AIR POLLUTION AND CONTROL

Course Objectives:

The course will address the following

1. To know the analysis of air pollutants
2. To know the threshold limit values of various air pollutants
3. To acquire the design principles of particulate and gaseous control
4. To learn plume behavior in different environmental conditions
5. To learn carbon credits for various day to day activities

.

SYLLABUS

UNIT-I

Air pollution: Sampling and analysis of air pollutants, conversion of ppm into $\mu g/m^3$. Definition of terms related to air pollution and control-secondary pollutants-indoor air pollution – climate change and its impact- carbon trade

UNIT-II

Thermo dynamics and kinetics of Air-pollution: Applications in the removal of gases like SO_X, NOX, CO and HC – Air- fuel ratio-Computation and control of products of combustion, Automobile pollution. Odour pollution control, Flares.

UNIT-III

Meteorology and Air pollution: Properties of atmosphere: Heat, pressure, wind forces, Moisture and relative humidity, Lapse rates – Influence of terrain and Meteorological phenomena on plume behaviour and air quality – Wind rose diagrams, plume rise models.

UNIT-IV

Ambient Air quality management: Monitoring of SPM, SO2; NO_X and CO –Stack monitoring for flue gases –Micro – meteorological monitoring –weather station. Emission standards – Gaussian model for plume Dispersion.

UNIT-V

Air pollution control : control of particulates – control at sources, process changes, equipment modifications, Design and operation of control equipments –Settling chambers ,Cyclone separators –Fabric filters, scrubbers ,Electrostatic precipitators .

UNIT-VI

Air pollution control methods: Control of NO_X and SO_X emissions –Environmental friendly fuels – In-plant Control Measures, Process changes, Methods of removal and recycling. Environmental criteria for setting industries and Green belts.

TEXT BOOKS:

1. Air pollution by M.N.RAO and H.V.N RAO- Tata McGraw Hill company.
2. Air Pollution and control by KVSG Murali Krishna.

REFERENCE BOOKS:

1. An introduction to Air Pollution by R.K Trivedy and P.K Goel, B.S Publications.
2. Air Pollution by Wark and Warner- Harper & Row. Newyork .

COURSE OUTCOMES

By the end of course the students will be able to

- Decide the ambient air quality based on the analysis of air pollutants
- The design principles of particulate and gaseous control measures for an industry
- Judge the plume behavior in a prevailing environmental conditions
- Estimate carbon credits for various day to day activities

Irrigation Design & Drawing

SYLLABUS

DESIGN DRAWING OF

Unit: I SURPLUS WEIR

Unit: II TANK SLUICE WITH A TOWER HEAD

Unit: III CANAL DROP – NOTCH TYPE

Unit: IV CANAL REGULATOR

Unit: V UNDER TUNNEL

Unit:VI SYPHON AQUEDUCT TYPE –III

Final Examination pattern:

Out of two questions out of the above design may be asked out of which the candidate has to answer one question with in the stipulated time three hours .

COURSE OUTCOMES

The students will be able to

i. Perform the stability analysis of gravity dams

ii. Explain the causes of failure of different types of dams and their design criteria

iii. Design minor irrigation structures such as regulators, cross drainage works and canal falls.

iv. At the end of the course, the student will be able to provide design & drawing of irrigation structures.

ENVIRONMENTAL ENGINEERING-II

Course objectives:

1. Outline planning and the design of waste water collection, conveyance and treatment systems for a community/town/city.
2. Provide knowledge of characterization of wastewater generated in a community.
3. Impart understanding of treatment of sewage and the need for its treatment.
4. Summarize the appurtenance in sewerage system and their necessity.
5. Teach planning, and design of septic tank and imhoff tank and the disposal of the effluent from these low cost treatment systems.

UNIT-I

INTRODUCTION TO SANITATION: System of sanitation and relative merits and demerits, Collection and conveyance of waste water, Sewage and their classification, Estimation of sewage flow and storm, Water drainage, flucation and types of sewers, Hydraulics of sewers and storm drains, Design of sewers, Appurtenances in sewerage, Cleaning and venations of sewers.

UNIT-II

PUMPING OF WASTE WATER: Pumping stations and Locations, Components and types of pumps, Suitability of pumps regarding waste water.
HOUSE PLUMBING: System of plumbing, sanitary fitting and other accessories, One and two pipe system, Design of building drainage.

UNIT-III

SEWAGE CHARACTEISTICS: Sampling and analysis of waste water, Physical, Chemical and Biological Examination, Measurement of BOD and COD and BOD equations.
TREATMENT OF SEWAGE: Primary treatment Screens, Grit chambers and Grease traps, Floatation and Sedimentation, Design of preliminary treatment units, Design of primary treatment units.

UNIT-IV

SECONDARY TREATMENT: Aerobic and anaerobic treatment process and comparison.
SUSPENDED GROWTH PROCESS: Activated sludge process and Principle, Design and Operational problems, Modification of activated sludge process, Oxidation ponds and Aerated lagoons.
ATTACHED GROWTH PROCESS: Trickling filters and Classification, Mechanism of impurities removal, Design, Operation and Maintenance, RBCs, Fluidized bed reactors.

UNIT-V

MISCELLANEOUS TREATMENT METHODS: Nitrification and DE Nitrification, Removal of Phosphates, UASB and Membrane reactors, integrated fixed film reactors, Anaerobic Process: Septic and Imhoff tanks, Working, Principles and Design, Disposal of septic tank effluent.

UNIT-IV

BIO - SOLID MANAGEMENT: Characteristics, Handling and treatment of sludge, anaerobic digestion of sludge.
DISPOSAL OF SEWAGE: Methods of disposal, Disposal into water bodies, Oxygen sag curve, Disposal on land and Sewage sickness.

Text Books:

T1. Environmental engineering-II by K.V.S.G.MURALI KRISHNA

T2. Environmental engineering-II by P.VENUGOPALA RAO

References:

R1. Water supply engineering-II by P.N.Modi

R2. . Environmental engineering-II by B.C.Punmia.

COURSE OUTCOMES

At the end of this course the student will be able to

1. Plan and design the sewerage system.
2. Characterization of sewage.
3. Select the appropriate appurtenances in the sewerage system.
4. Selection of suitable treatment flow for sewage treatment.
5. Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river.

GEO TECHNICAL ENGINEERING-II

Course Objective:

1. To provide a coherent development to the students for the courses in sector of Geotechnical Engineering & Soil Improvement Techniques etc.
2. To present the foundations of many basic Engineering tools and concepts related Geotechnical Engineering.
3. To give an experience in the implementation of Engineering concepts which are applied in field of Geotechnical Engineering
4. To involve the application of scientific and technical principles of planning, analysis, design of foundation along with soil improvement techniques.

UNIT – I

Stability of Slopes: Infinite and finite earth slopes in sand and clay – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices – Taylor's Stability Number-Stability of slopes of dams and embankments - different conditions.

UNIT-II

Earth Retaining Structures:

Rankine's& Coulomb's theory of earth pressure – Culmann's graphical method - earth pressures in layered soils.

UNIT-III

Shallow Foundations – Bearing Capacity Criteria: Types of foundationsand factors to be considered in their location - Bearing capacity – criteria for determination of bearing capacity – factors influencing bearing capacity – analytical methods to determine bearing capacity – Terzaghi's theory - IS Methods.

Settlement Criteria: Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – Types of foundation settlements and their determination - allowable settlements of structures.

UNIT -IV

Pile Foundation: Types of piles – Load carrying capacity of piles based onstatic pile formulae – Dynamic pile formulae– Pile load tests - Load carrying capacity of pile groups in sands and clays.

UNIT-V

Well Foundations: Types – Different shapes of well – Components of well– Functions –

forces acting on well foundations - Design Criteria – Determination of steining thickness and plug - construction and Sinking of wells – Tilt and shift.

UNIT – VI

Soil Exploration: Need – Methods of soil exploration – Boring andSampling methods – Field tests – Penetration Tests – Pressure meter – planning of Programme and preparation of soil investigation report.

TEXT BOOKS:

1. Basic and Applied Soil Mechanics by GopalRanjan& ASR Rao, New Age International Pvt. Ltd, (2004).
2. Foundation Engineering by Varghese,P.C., Prentice Hall of India., New Delhi.
3. Soil Mechanics and Foundations by - by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES:

1. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition)
2. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.
3. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd (1998).
4. Geotechnical Engineering by S. K.Gulhati& Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
5. Teng,W.C – Foundation Design , Prentice Hall, New Jersy Soil Mechanics and Foundation Engineering, by K R Arora, McGraw-Hill Publishing company, Newyork

COURSE OUTCOMES :

1. The students will gain an experience in the implementation of Geotechnical Engineering on engineering concepts which are applied in field Geotechnical Engineering.
2. The students will get a diverse knowledge of geotechnical engineering practices applied to real life problems of designing of structures.

The students will learn to understand the theoretical and practical aspects of geotechnical engineering along with the design and management applications

Remote Sensing & GIS Applications

SYLLABUS

UNIT – I

Introduction to remote sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces characteristics of remote sensing systems.

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, spaceborne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT.

UNIT – II

Image analysis: Introduction, elements of visual interpretations, digital image processing- image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

UNIT – III

Geographic Information System: Introduction, key components, application areas of GIS, map projections.

Data entry and preparation: spatial data input, raster data models, vector data models.

UNIT – IV

Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing.

UNIT – V

RS and GIS applications General: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications.

UNIT – VI

Application to Hydrology and Water Resources: Flood zoning and mapping, groundwater prospects and potential recharge zones, watershed management.

TEXT BOOKS:

1. Bhatta B (2008), "Remote Sensing and GIS", Oxford University Press.
2. Lillesand, T. M, R.W. Kiefer and J. W. Chipman (2013) "Remote Sensing and Image Interpetation", Wiley India Pvt. Ltd., New Delhi.
3. Schowenger, R.A (2006) 'Remote Sensing" Elsevier Publishers.
4. "Fundamentals of Remote Sensing" by Georg Joseph, Universities Press, 2013.
5. "Fundamentals of Geographic information System" by Demers, M. N, Wiley India Pvt. Ltd, 2013.

REFERENCES:

1. "Remote Sensing and its Applications" by Narayana LRA, Universities Press, 2012.
2. "Concepts and techniques of Geopraphical Information System" by Chor Pand Lo and A. k. W. Yeung, Prentice Hall (India), 2006.
3. "Introduction to Geographic Information Systems" by Kand Tsung Chang, McGraw Hill Higher Education, 2009.
4. "Basics of remote Sensing & GIS" by Kumar S, Laxmi Publications, New Delhi, 2005.
5. "Principles of Geographical Information System" by Burrough P. A and R.A, McDonnell, Oxford University Press, 1998.

COURSE OUTCOMES

At the end of the course the student will be able to

a) Be familiar with ground, air and satellite based sensor platforms.
b) Interpret the aerial photographs and satellite imageries.
c) Create and input spatial data for GIS application.
d) Apply RS and GIS concepts in water resources engineering.

WRE-II

Course Objectives:

The course will address the following

1. Introduce the types of irrigation systems
2. Introduce the concepts of planning and design of irrigation systems
3. Discuss the relationships between soil, water and plant and their significance in planning an irrigation system
4. Understand design methods of erodible and non-erodible canals
5. Know the principles of design of hydraulic structures on permeable foundations
6. Know the concepts for analysis and design principles of storage and diversion head works

.

SYLLABUS

UNIT – I

Irrigation : Necessity and importance , principal crops and crop seasons, types, methods of application, soil –water-plant relationship, soil moisture constants , consumptive use, estimation of consumptive use, crop water requirement, duty and delta, factors affecting duty, depth and frequency of irrigation, irrigation efficiencies ,water logging and drainage, standards of quality for irrigation water, crop rotation.

UNIT – II

Canals : Classification ,designof non erodible canals- Methods of economic section and maximum permissible velocity, economics of canal lining , Design of erodible canals- Kennedy's silt theory and Lacey's regime theory balancing depth of cutting.

UNIT – III

Canal structures

Falls: Types andlocation, Design principles of sarda type of fall and straight glacis fall .

Regulators: Head and cross regulators, Design principles.

Cross drainage works: Types, selection, Design principles of aqueduct, Siphon aqueduct and super passage.

Outlets: Types, proportionality, sensitivity and flexibility

River training: Objectives and approaches.

Trees: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, operation on a Binary tree, Binary Tree Traversals (recursive), Creation of binary tree from in, pre and post order traversals.

UNIT –IV

Diversion head works : Types of diversion head works ,weirs and barrages, lay out of diversion head works, components. Causes and failures of weirs on permeable foundations, Bligh's creep theory, khosla's theory, Design of impervious floors for sub surface flow, Exit gradient

UNIT – V

Reservoir planning: Investigation, site selection, Zones of storage, yield and storage capacity of reservoir, reservoir sedimentation.

Dams: Types of dams**,** Selectionof type of dam, selection of site for a dam.

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a dam, Stability analysis, drainage galleries, grouting.

UNIT – VI

Earth dams: Types , causes of failure , criteria for safe design, seepage measures for control of seepage – filters, Stability analysis – Stability of downstream slope during steady seepage and u/s slope during sudden draw down conditions.

Spillways: Types and design principles of Ogee spillways, Types of spillway crest gates. Energy dissipation below spillways- stilling basin and its appurtenances

TEXT BOOKS :

1. Irrigation and water power engineering by Punmia B C,P.B.B Lal,A.K.Jain and A.K.Jain .
2. Irrigation water resources and water power engineering by Modi P N .

REFERENCE BOOKS :

1. Water Resources Engineering by Mays L.W, Wiley India Pvt.Ltd, New Delhi.
2. Irrigation Engineering by Sharma R.K. and Sharma T.K.
3. Water Resources Engineering by Satyanarayana Murthy Challa

COURSE OUTCOMES

.By the end of course the students will be able to

1. Estimate irrigation water requirements

2. Design irrigation canals and canal networks

3. Plan an irrigation system

4. Design irrigation canal structures

5. Plan and design diversion head works

Prerequisites: Basics of Copyrights and patents

SYLLABUS

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

Unit I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics - Types of Intellectual Property - Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement - Regulatory – Over use or Misuse of Intellectual Property Rights -Compliance and Liability Issues.

Unit II

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership –Transfer and Duration – Right to prepare Derivative Works –Rights of Distribution – Rights of performers – Copyright Formalities and Registration– Limitations – Infringement of Copyright – International Copyright Law- Semiconductor Chip Protection Act.

Unit III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation –International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty – New developments in Patent Law- Invention

Developers and Promoters.

Unit IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Interparty Proceedings – Infringement – Dilution of Ownership of Trade Mark –Likelihood of confusion – Trade Mark claims – Trade Marks Litigation –International Trade Mark Law

Unit V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security– Employee Access Limitation – Employee Confidentiality Agreement –Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.

Unit VI

Introduction to Cyber Law – Information Technology Act - Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.

REFERENCE BOOKS:

1. Deborah E.Bouchoux: “Intellectual Property”. Cengage learning, New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western’s Special Topics Collections
4. Prabhuddha Ganguli: ‘ Intellectual Property Rights” Tata Mc-Graw –Hill, New Delhi
5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.
7. M.Ashok Kumar and Mohd.Iqbal Ali: “Intellectual Property Right” Serials Pub.

COURSE OUTCOMES

Upon the successful completion of this course, the students will be able to:

CO1: To understand about the basics of the intellectual property law.

CO2: To enlighten the students regarding the subject matter of copy-right law

CO3. To explain the patent process and the rights which come with a patent holders

CO4. To enable the students regarding the registration, maintaining and protection of trademark.

CO5. To make aware about the employee confidentiality agreements, non-disclosure agreements, and liability issues.

CO 6: To equip the students with the knowledge regarding cyber crime and e-commerce.